

MCA
(SEM-III) THEORY EXAMINATION, 2019-20
INTRODUCTION TO PROGRAMMING & COMPUTER ORGANIZATION

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A1. **Attempt all questions in brief.** **2 x 7 = 14**

a.	What do you mean by disjoint sets?
b.	Discuss Cartesian product of two sets.
c.	What do you mean by range of a relation?
d.	Discuss Complement law of Boolean algebra.
e.	How write operation is performed in memory?
f.	Explain indirect mode of instruction.
g.	Discuss do-while statement.

SECTION B2. **Attempt any three of the following:** **7 x 3 = 21**

a.	Prove the following by mathematical induction : $1^2 + 2^2 + 3^2 + \dots + n^2 = [n(n+1)(2n+1)] / 6$
b.	What do you mean by partial order relation? Explain with the help of example.
c.	Simplify the following function with don't-care conditions : $F(A, B, C) = \sum (0, 2, 6)$ and $d(A, B, C) = \sum (1, 3, 5)$
d.	Discuss timing and control used for computer instructions.
e.	What is pseudocode? Discuss advantages and limitations of pseudocodes.

SECTION C3. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	Let P and Q be the relation on set $A = \{1, 2, 3, 4\}$ defined by $P = \{(1, 2), (2, 2), (2, 3), (2, 4), (3, 2), (4, 2), (4, 3)\}$ $Q = \{(2, 2), (2, 3), (3, 2), (3, 3), (3, 4), (4, 1), (4, 2)\}$ Find (i) PoP (ii) PoQ (iii) PoPoQ
(b)	Consider the relation ' \leq ' on the set $A = \{2, 3, 4, 5\}$. Determine its inverse.

4. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	Discuss various types of functions applied on sets.
(b)	Let $A = \{4, 5, 6, 7\}$. Determine whether the relation $R = \{(4, 5), (5, 4), (7, 6), (6, 7)\}$ is reflexive, symmetric, transitive or anti-symmetric.

5. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	A sequential circuit has two D flip-flops A and B, two inputs x and y, and one output z. The flip-flop input equations and the circuit output are as follows: $D(A) = x'y + xA$, $D(B) = x'B + xA$, $z = B$. Draw the logic diagram and state table.
(b)	Show that half adder can be converted to half subtracter by using an additional NOT gate.

6. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	Explain four phases instruction pipeline.
(b)	Discuss IEEE format for floating-point representation.

7. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	Discuss storage classes in C with the help of example.
(b)	What is algorithm? Discuss algorithm for adding first ten numbers.